

1 CLAIMS:

2 1. A method of forming an oxide region over a semiconductor
3 substrate, comprising:

4 forming a nitrogen-containing layer across at least some of the
5 substrate; and

6 after forming the nitrogen-containing layer, growing an oxide region
7 from the at least some of the substrate, the nitrogen of the nitrogen-
8 containing layer being dispersed within the oxide region.

9
10 2. The method of claim 1 wherein the substrate comprises
11 silicon and the oxide region comprises silicon dioxide.

12
13 3. The method of claim 1 wherein the substrate comprises
14 monocrystalline silicon and the oxide region is grown from the
15 monocrystalline silicon and comprises silicon dioxide.

16
17 4. The method of claim 1 wherein the nitrogen-comprising layer
18 is formed from plasma activated nitrogen species.

5. The method of claim 1 wherein the nitrogen-comprising layer is formed by remote plasma nitridation utilizing nitrogen species generated in a plasma that is at least about 12 inches from the substrate.

6. The method of claim 1 wherein the nitrogen-comprising layer is formed by remote plasma nitridation utilizing nitrogen species generated in a plasma that is at least about 12 inches from the substrate; and wherein the substrate not being biased relative to the plasma during formation of the nitrogen-comprising layer.

7. The method of claim 6 wherein the substrate is maintained at a temperature of from about 550°C to about 1000°C during formation of the nitrogen-comprising layer.

8. The method of claim 6 wherein the substrate is exposed to the nitrogen species for a time of from greater than 0 minutes to about 5 minutes.

9. The method of claim 1 wherein the nitrogen-comprising layer is formed by plasma nitridation utilizing nitrogen species generated in a plasma that is at least about 4 inches from the substrate.

1 10. The method of claim 9 wherein the substrate is maintained
2 at a temperature of from about 0°C to about 400°C during formation
3 of the nitrogen-comprising layer.

4
5 11. The method of claim 9 wherein the substrate is exposed to
6 the nitrogen species for a time of from greater than 0 seconds to about
7 about 30 seconds.

8
9 12. A method of forming a pair of oxide regions over a
10 semiconductor substrate, comprising:

11 forming a first oxide region which covers only a portion of the
12 substrate;

13 forming a nitrogen-comprising layer across at least some of the
14 first oxide region and across at least some of the substrate that is not
15 covered by the first oxide region; and

16 after forming the nitrogen-comprising layer, growing a second oxide
17 region from the at least some of the substrate.

17. A method of forming a pair of transistors associated with a semiconductor substrate, comprising:

defining a first region and a second region of the substrate;

forming a first oxide region which covers at least some of the first region of the substrate and which does not cover at least some of the second region of the substrate;

forming a nitrogen-comprising layer across at least some of the first oxide region and across at least some of the uncovered second region of the substrate;

after forming the nitrogen-comprising layer, growing a second oxide region from the uncovered second region of the substrate;

forming a first transistor gate over the first oxide region and a second transistor gate over the second oxide region;

forming first source/drain regions proximate the first transistor gate; and

forming second source/drain regions proximate the second transistor gate.

18. The method of claim 17 wherein the second oxide region is grown to be thicker than the first oxide region.

19. The method of claim 17 wherein the first oxide region is formed by:

forming an oxide layer over the first and second regions of the substrate; and

removing the oxide layer from over the at least some of the second region of the substrate.

20. The method of claim 17 wherein the substrate comprises silicon and the oxide regions comprise silicon dioxide.

21. The method of claim 17 wherein the substrate comprises monocrystalline silicon and the oxide regions comprise silicon dioxide; and wherein the first oxide region is grown from the monocrystalline silicon substrate.

22. The method of claim 17 wherein the nitrogen-comprising layer is formed by remote plasma nitridation utilizing nitrogen species generated in a plasma that is at least about 12 inches from the substrate.

24. A method of forming a pair of transistors associated with a semiconductor substrate, comprising:

defining a first region and a second region of the substrate, the first region being a p-type doped region and the second region being an n-type doped region;

forming a first oxide region which covers at least some of the first region of the substrate and which does not cover any of the second region of the substrate;

forming a nitrogen-comprising layer across at least some of the first oxide region and across at least some of the second region of the substrate;

after forming the nitrogen-comprising layer, growing a second oxide region from the second region of the substrate;

forming a first transistor gate over the first oxide region and a second transistor gate over the second oxide region;

forming first source/drain regions proximate the first transistor gate to form a PMOS transistor comprising the first transistor gate; and

forming second source/drain regions proximate the second transistor gate to form an NMOS transistor comprising the second transistor gate.

1 25. The method of claim 24 wherein the PMOS transistor gate
2 comprises p-type doped silicon, and wherein the nitrogen-containing layer
3 formed over the oxide region prevents p-type dopant migration from the
4 doped silicon to the first substrate region.

5
6 26. The method of claim 24 wherein the second oxide region is
7 grown to be thicker than the first oxide region.

8
9 27. The method of claim 24 wherein the nitrogen-comprising
10 layer is formed by remote plasma nitridation utilizing nitrogen species
11 generated in a plasma that is at least about 12 inches from the
12 substrate.

13
14 28. The method of claim 24 wherein the nitrogen-comprising
15 layer is formed by plasma nitridation utilizing nitrogen species generated
16 in a plasma that is at least about 4 inches from the substrate.